

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

Claim 1. (Original) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds;
- (2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and
- (3) drying the gel.

Claim 2. (Previously Presented) Process according to Claim 1, characterized in that the organic polymers, polymer precursors, or mixtures thereof are based on formaldehyde or formaldehyde-containing resins, polyvinyl alcohol, or poly(meth)acrylates.

Claim 3. (Previously Presented) The process according to Claim 1, characterized in that sodium silicate, laminar silicates or silicic acids are used as the silicon dioxide compounds.

Claim 4. (Previously Presented) Process according to Claim 1, characterized in that fillers in the form of particles, fibers, fabrics, nonwovens, mats, or mixtures thereof or functional substances such as dyes, indicators, biomolecules, receptors or mixtures thereof are added to the aqueous solution.

Claim 5. (Currently Amended) Process ~~according to Claim 1~~, for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds;
- (2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and
- (3) drying the gel,

characterized in that the water in the materials is replaced by an organic solvent before drying, and in that the silica gels are modified organically by silylation.

Claim 6. (Currently Amended) Process ~~according to Claim 1~~, for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds;
- (2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and
- (3) drying the gel,

characterized in that drying is conducted under conditions which lead to a composite material, where the composite material can then be calcined.

Claim 7. (Previously Presented) Process according to Claim 1, characterized in that drying is conducted under conditions which lead to a xerogel or to an aerogel.

Claim 8. (Previously Presented) Materials with organic and inorganic networks which interpenetrate on a scale of no more than 100 nm and are obtained by a process according to Claim 1.

Claim 9. (Original) Aerogel consisting of organic and inorganic networks interpenetrating on a scale of no more than 100 nm with a density of no more than 0.6 g/cm³.

Claims 10-11 (Cancelled)

Claim 12. (Currently Amended) Molded article ~~or surface coating~~ consisting of material according to Claim 8.

Claim 13. (Currently Amended) Process for the production of molded articles ~~or surface coatings~~ according to Claim 12, characterized in that the aqueous solutions or dispersions are introduced into a mold ~~or applied to a surface~~ and in that a gel is then formed and dried.

Claim 14. (Cancelled)

Claim 15. (Currently Amended) Molded article ~~or surface coating~~ consisting of material according to Claim 9.

Claim 16. (Currently Amended) Process for the production of molded articles ~~or surface coatings~~ according to Claim 15, characterized in that the aqueous solutions or dispersions are introduced into a mold ~~or applied to a surface~~ and in that a gel is then formed and dried.

Claims 17-19 (Cancelled)

Claim 20. (Previously Presented) A process of producing materials, the process comprising:

(a) providing organic and inorganic networks which interpenetrate on a scale of no more than 100 nm, the organic and inorganic networks which interpenetrate on a scale of no more than 100 nm produced by a method comprising:

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds,
- (2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks, and
- (3) drying the gel;

(b) producing materials using the gel, the materials comprising thermal insulation properties, sound absorption properties, adsorption properties and/or barrier properties against water and/or organic solvent.

Claim 21. (Previously Presented) The process of claim 20 in which the gel is dried under conditions which lead to a composite material.

Claim 22. (Currently Amended) ~~The~~A process of ~~claim 21~~ producing materials, the process comprising:

(a) providing organic and inorganic networks which interpenetrate on a scale of no more than 100 nm, the organic and inorganic networks which interpenetrate on a scale of no more than 100 nm produced by a method comprising:

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds,

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks, and

(3) drying the gel;

(b) producing materials using the gel, the materials comprising thermal insulation properties, sound absorption properties, adsorption properties and/or barrier properties against water and/or organic solvent,

in which the gel is dried under conditions which lead to a composite material and in which the produced materials are granulates or molded ceramic articles.

Claim 23. (Previously Presented) The process of claim 20 in which the gel is dried under conditions which lead to a xerogel or an aerogel.

Claim 24. (Previously Presented) The process of claim 23 in which the produced materials comprise molded articles ~~or surface coatings~~.

Claim 25. (Previously Presented) A process of using materials for medical diagnostics and sensor technology, the process comprising:

(a) providing organic and inorganic networks which interpenetrate on a scale of no more than 100 nm, the organic and inorganic networks which interpenetrate on a scale of no more than 100 nm produced by a method comprising:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds,

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks, and

- (3) drying the gel;
- (b) producing materials comprising the gel in conjunction with dyes, indicators, receptors, enzymes and/or biomolecules; and
- (c) using the materials for medical diagnostics and sensor technology.

Claim 26. (Previously Presented) The process of claim 25 in which the materials have a density of no more than 0.6 g/cm^3 .

Claim 27. (Previously Presented) The process of claim 25 in which the materials comprise a molded article or surface coating.

Claim 28. (Previously Presented) The process of claim 27 in which the materials have a density of no more than 0.6 g/cm^3 .

Claim 29. (Previously Presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds, wherein the organic polymers, polymer precursors, or mixtures thereof are formaldehyde or formaldehyde-containing resins, polyvinyl alcohol, or poly(meth)acrylates;
- (2) changing the pH of the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and
- (3) drying the gel.

Claim 30. (Previously Presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds, wherein the organic polymers, polymer precursors, or mixtures thereof are formaldehyde or formaldehyde-containing resins, polyvinyl alcohol, or poly(meth)acrylates;
- (2) thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and
- (3) drying the gel.

Claim 31. (Previously Presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

- (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds, wherein the organic polymers, polymer precursors or mixtures thereof are selected from the group consisting of polyethylene glycol, carboxymethylcellulose, polyamides, polyvinylamines, bile acid homopolymers, bile acid copolymers, bile acid oligomers, melamine resins, phenolic resins, resorcinol resins, melamine-formaldehyde resins, resorcinol-formaldehyde condensates and polyacrylic acids;
- (2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and
- (3) drying the gel.

Claim 32. (New) Surface coating consisting of material according to Claim 8.

Claim 33. (New) Process for the production of surface coatings according to Claim 12, characterized in that the aqueous solutions or dispersions are applied to a surface and

in that a gel is then formed and dried.

Claim 34. (New) Surface coating consisting of material according to Claim 9.

Claim 35. (New) The process of claim 23 in which the produced materials comprise surface coatings.

Claim 36. (New) Process for the production of surface coatings according to Claim 34, characterized in that the aqueous solutions or dispersions are applied to a surface and in that a gel is then formed and dried.

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